

The 1977-78 albacore fishery in New Zealand waters

8

LIBRARY

OCT 26 1982

National Marine Fisheries Service
2570 Dole Street
Honolulu, Hawaii

by G. Habib, R.M. Cade,
C.L. Carey, G.J. Voss,
and P.M. Swanson

Fisheries Research Division
Occasional Publication: Data Series No. 8

The 1977-78 albacore fishery in New Zealand waters

by G. Habib, R.M. Cade*,
C.L. Carey, G.J. Voss,
and P.M. Swanson

*Fisheries Management Division
Ministry of Agriculture and Fisheries
Nelson

Fisheries Research Division
Occasional Publication: Data Series No. 8
1982

Published by the New Zealand Ministry
of Agriculture and Fisheries
1982

ISSN 0111-8404

Contents

	<i>Page</i>
Fig. 1 - Areas and subareas of the albacore fishery ..	4
Introduction	5
Location of the fishery	5
Vessels	6
Gear and fishing methods	6
Data collection and results	6
Fig. 2 - Length-frequency distributions	7
Fig. 3 - Length-weight relationship	8
Fig. 4 - Sea surface temperature recordings from vessels	9
Fig. 5 - Sea surface temperature charts from satellite measurements	10
Acknowledgments	12
Table 1 - Catch and landings by area and class of vessel	13
Table 2 - Monthly and season's catch by number of vessels and number of landings by area ..	14
Table 3 - Catches by time of day	15
Table 4 - Catch rates of monitored vessels	16
Table 5 - Catch rates of top vessel in Greymouth fleet ..	17
Table 6 - Catch rates of top vessel in Gisborne-Napier fleet	18
Table 7 - Catch rates of vessel fishing in Bay of Plenty	19

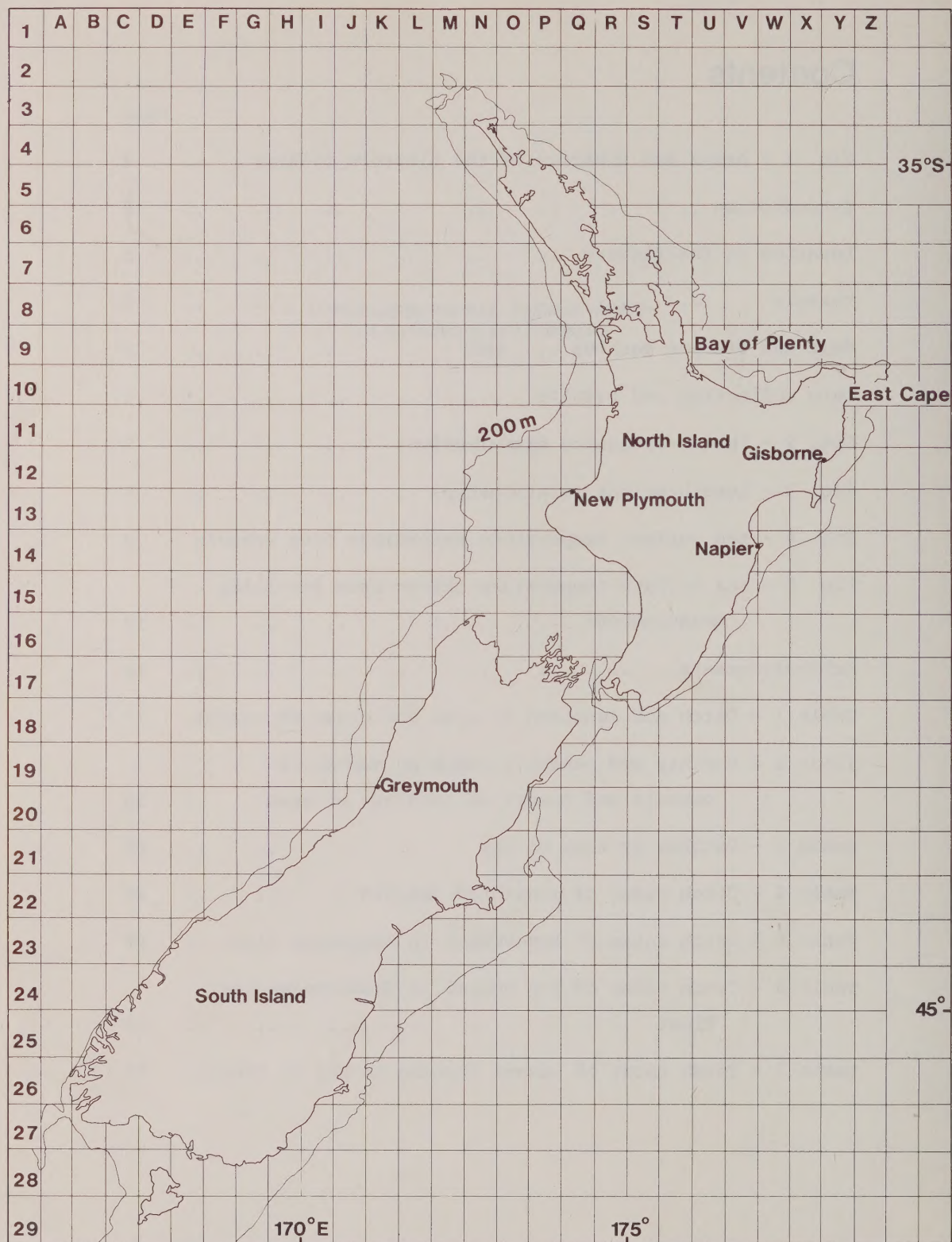


Fig. 1: Areas and subareas of the 1978 New Zealand albacore fishery.

Introduction

Albacore tuna (*Thunnus alalunga*) is a highly migratory fish species which is widely distributed in the world's oceans. In the Pacific Ocean it is distributed between about 45° N and 45° S. In the south Pacific, albacore are concentrated between 10° and 30° S in the area between 150° E and 120° W; the species spawns during summer in oceanic subtropical waters centred around 20° S, and its distribution expands to the south with the southern summer warming in the ocean and contracts with the winter cooling.

The movements southward are of juvenile fish in surface and near-surface schools. The migrations into New Zealand waters have been the target of small commercial operations since about 1970, and in 1974 the landings from trolling vessels reached 890 t.

Since the 1976-77 (1977) season the Ministry of Agriculture and Fisheries (MAF) has monitored catch-per-effort of the commercial fleet fishing for albacore and related this to environmental parameters and albacore biology. The results of observations on the 1977 season were presented in *Fisheries Research Division Occasional Publication No. 15*. This publication presents fisheries data on the 1978 season, which was from January to May.

Location of the fishery

Small vessels have traditionally fished for albacore off the coast of the North Island south of East Cape (see *Fisheries Technical Report, N.Z. Marine Department, No. 40*) and west of New Plymouth (see *Fisheries Technical Report, N.Z. Marine Department, No. 80*), and off the west coast of the South Island (see *Fisheries Research Division Occasional Publications No. 8 and 12*). In 1978 fishing was conducted mainly south of East Cape to the east of Gisborne and Napier, and off the west coast of the South Island west of Greymouth. There was also a brief period of fishing in the Bay of Plenty (Fig. 1).

Vessels

There were 166 vessels in the fishery and these ranged from 6 to 25 m in length. As in 1977 the seasonal nature of the fishery and the variability in the distribution and abundance of the resource caused many of the vessels to fish for albacore part time while pursuing other species such as rock lobsters and demersal fish. To distinguish between the different degrees of commitment to the albacore fishery, vessels were separated into three classes in the analyses:

- A, those which fished full time for albacore;
- B, those which fished exclusively for albacore, but only occasionally, such as when there was a financial need or when albacore were plentiful;
- C, those which fished only occasionally for albacore while pursuing other species.

A fleet of 97 vessels (53 A, 13 B, 31 C) operated from Greymouth and 68 (6 A, 10 B, 52 C) from Gisborne-Napier. A chartered American pole-and-lin vessel (A class) fished in the Bay of Plenty for a brief period late in the season.

Gear and fishing methods

Most of the fish were troll caught on 5 to 12 lures towed at various depths and distances behind the vessels (as shown in *Fisheries Technical Report, N.Z. Marine Department, No. 46*). Crews of one to seven persons hauled the lines by hand or by mechanical line hauler. Small quantities of albacore were taken by pole and line on a few vessels.

Fish were stored in ice, refrigerated brine, or in blast freezers and offloaded at shore plants within 1 to 10 days of capture.

Data collection and results

The Fisheries Divisions of MAF placed log books aboard many of the vessels in the fishery to record catch, effort, biological, and environmental data. Observers made occasional sea trips to help collect these data, and they also collected further information at the fish-landing sites.

Samples of albacore from occasional catches were measured to the whole centimetre below the actual length and weighed to the nearest 20 g. From these data, length-frequency distributions and a length-weight relationship were plotted (Figs. 2 and 3).

Sea surface temperatures were measured by observers or crew aboard the vessels (Fig. 4). Satellite measurements were also available from

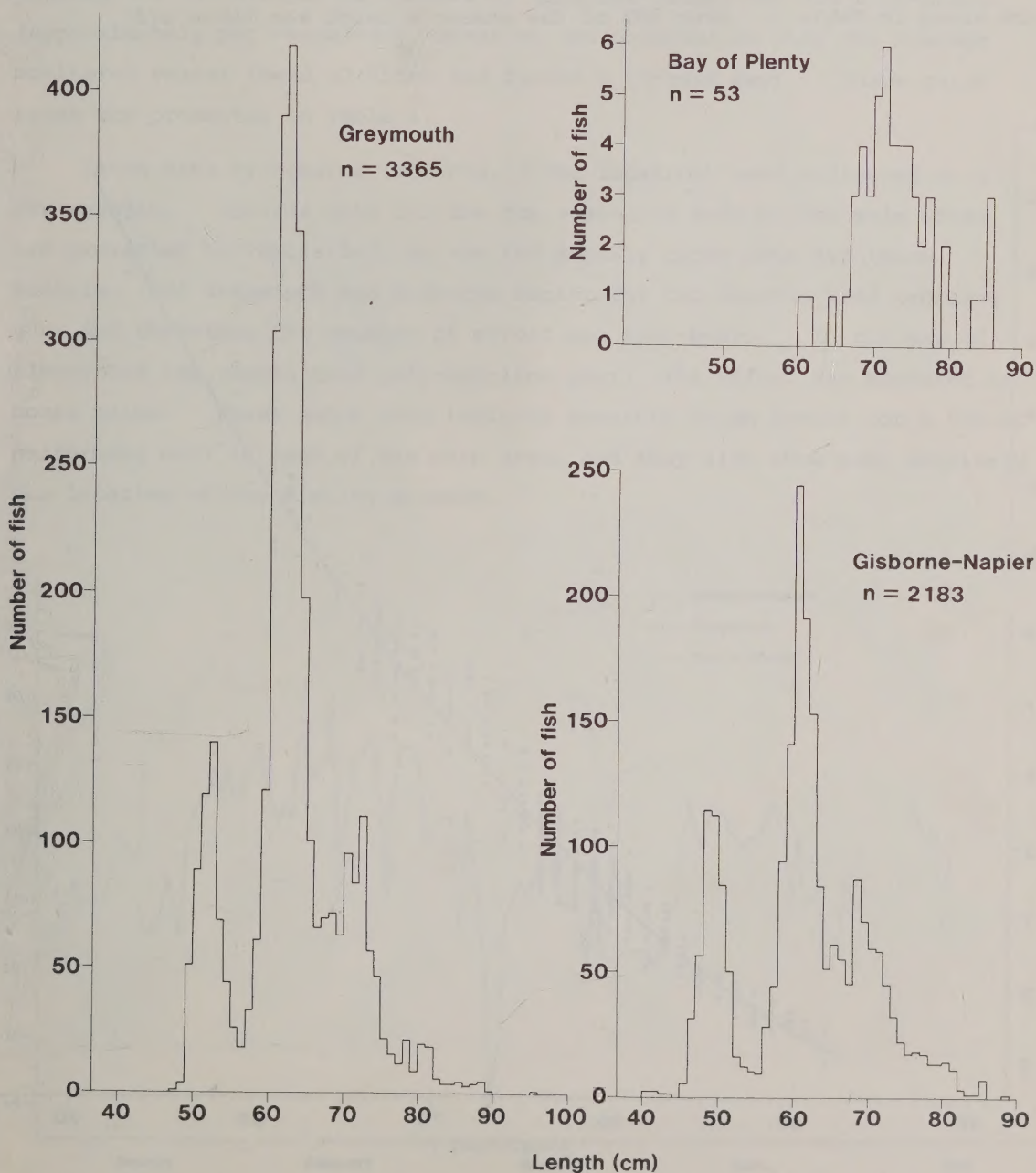


Fig. 2: Length-frequency distributions for albacore taken in the 1978 New Zealand fishery.

the National Oceanic and Atmospheric Administration of the United States Department of Commerce (Fig. 5). In past seasons most albacore have been caught where sea surface temperatures were between 17 and 20 °C (see *Fisheries Research Division Occasional Publications No. 8, 12, and 15*). This range is shaded in Fig. 5 to indicate the possible location of albacore throughout the season.

Albacore season catches and landings by area and by class of vessel are shown in Table 1. Over 90% of the season's catch was taken off

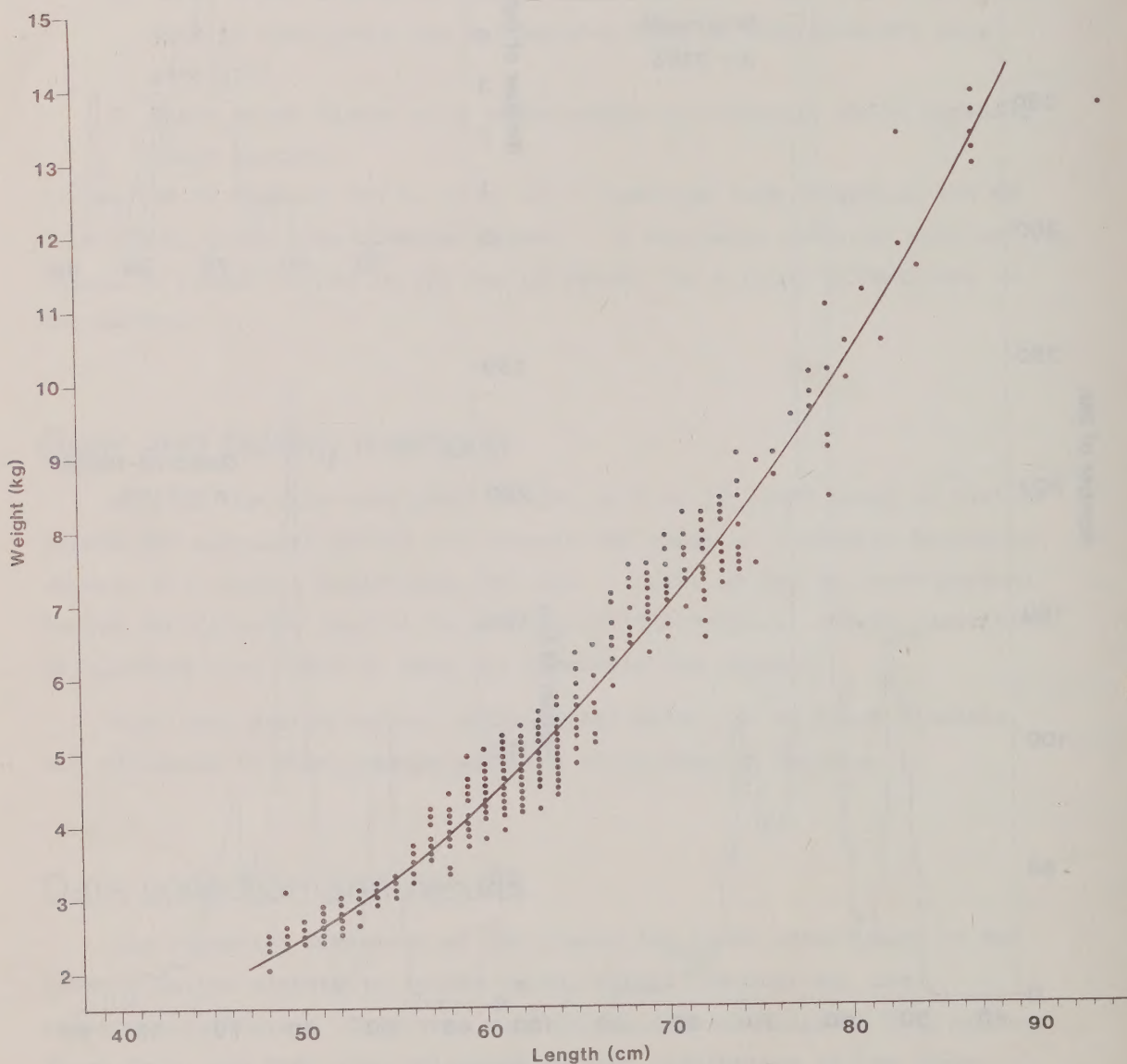


Fig. 3: Length-weight relationship for albacore taken in the 1978 New Zealand fishery; $\log_e \text{weight} = -10.97 + 3.02 \log_e \text{length}$.

Greymouth, mostly by A class vessels, which averaged 24.9 t of albacore per vessel for the season.

Monthly catches and landings by area are listed in Table 2, and catches by time of day are presented in Table 3. The best period for fishing varied according to the area.

Catch data from up to 21 Greymouth and 13 Gisborne-Napier vessels enabled the calculation of numbers of albacore caught per 100 hook-hours (approximately per vessel-day, based on the observation that the average monitored vessel towed 10 lines and fished a 10-hour day). These catch rates are presented in Table 4.

Catch data by subarea (see Fig. 1 for location) were collected on a few vessels. Subarea data for the top vessel in each of the main areas are presented in Tables 5-7, as are the monthly catch data for those vessels. Off Greymouth and Gisborne-Napier the top vessels used trolling gear and therefore the measure of effort was hook-hours. In the Bay of Plenty the top vessel used pole-and-line gear; its effort was measured as hours poled. These catch data indicate possible catch levels for a vessel performing well in each of the main areas and they also show more precisely the location of the fishing grounds.



Fig. 4: Sea surface temperature recordings from vessels in the 1978 New Zealand albacore fishery.



Fig. 5 (above and right): Weekly sea surface temperature charts for the New Zealand region, from satellite measurements, for the 1978 albacore season. Water of 17 to 20 °C ("albacore water") is shaded; isotherms are at 1 °C intervals.



Acknowledgments

We thank the owners and operators of the vessels and the fish-landing facilities for assistance, support, and provision of access to most of the data in this publication.

TABLE 1: Catch and landings by area (GM = Greymouth, G-N = Gisborne-Napier, BOP = Bay of Plenty) and class of vessel in the New Zealand albacore fishery, 1978 season

Area	Class of vessel	No. of vessels	% of area total	% of N.Z. total	Catch (t)	% of area catch	% of N.Z. catch
GM	A	53	55	32	1 321	86	78
	B	13	13	8	117	8	7
	C	31	32	19	98	6	6
	A-C	97		58	1 536		91
G-N	A	6	9	4	53	37	3
	B	10	15	6	41	29	2
	C	52	76	31	49	34	3
	A-C	68		41	143		8
BOP	A	1	100	1	7	100	< 1
All areas	A-C	166			1 686		

Area	Class of vessel	Mean season's catch per vessel (t)	No. of landings	% of area landings	% of N.Z. landings	Mean No. of landings per vessel
GM	A	24.9	456	76	42	8.6
	B	9.0	70	12	6	5.4
	C	3.2	72	12	7	2.3
	A-C	15.8	598		55	6.2
G-N	A	8.8	89	19	8	14.8
	B	4.1	125	26	12	12.5
	C	0.9	266	55	25	5.1
	A-C	2.1	480		45	7.1
BOP	A	7.0	1	100	< 0.1	1.0
All areas	A-C	10.2	1 079			6.5

TABLE 2: Monthly and season's catch of albacore by number of vessels and number of landings by area

Months	Greymouth			Gisborne-Napier		
	Catch (t)	No. of vessels	No. of landings	Catch (t)	No. of vessels	No. of landings
Jan	158	42	105	88	39	212
Feb	802	79	221	53	62	253
Mar	566	84	253	2	7	15
Apr	10	14	19	—*	—	—
May	—	—	—	—	—	—
Jan-May	1 536	97	598	143	68	480

Bay of Plenty			
Months	Catch (t)	No. of vessels	No. of landings
Jan	—	—	—
Feb	—	—	—
Mar	—	—	—
Apr	—	—	—
May	7	1	1
Jan-May	7	1	1

* No vessels in the area.

TABLE 3: Catches by time of day in the New Zealand albacore fishery, 1978 season (GM = Greymouth, G-N = Gisborne-Napier, BOP = Bay of Plenty)

Time period	Area	No. caught	% of total fish caught	No. of vessel-days sampled	% of total days sampled	Mean No. of fish per vessel-day sampled
0600 to 0859	GM	3 075	12	75	10	41.0
	G-N	1 228	5	76	10	16.2
	BOP	268	1	6	< 1	44.7
	All	4 571	18	157	20	29.1
0900 to 1159	GM	3 274	13	82	11	39.9
	G-N	2 495	10	96	13	26.0
	BOP	119	< 1	7	< 1	17.0
	All	5 888	23	185	24	31.8
1200 to 1459	GM	3 553	14	83	11	42.8
	G-N	1 828	7	92	12	19.9
	BOP	271	1	7	< 1	38.7
	All	5 652	22	182	24	31.1
1500 to 1759	GM	4 395	17	85	11	51.7
	G-N	967	4	57	7	17.0
	BOP	240	1	7	< 1	34.3
	All	5 602	22	149	19	37.6
1800 to 2059	GM	3 600	14	74	10	48.6
	G-N	148	< 1	12	2	12.3
	BOP	0	0	3	< 1	0
	All	3 748	15	89	12	42.1
2100 to 2359	GM	144	< 1	5	< 1	28.8
	G-N	-*	-	-	-	-
	BOP	-	-	-	-	-
	All	144	< 1	5	< 1	28.8
0600-2359	All	25 605		767		33.4

* No fishing.

TABLE 4: Catch rates of albacore landed by monitored vessels in the New Zealand fleet off Greymouth (GM) and Gisborne-Napier (G-N), 1978 season

Area	Time period	No. of vessels	Hours fished	No. of hook-hours
GM	Jan	6	600	5 860
	Feb	21	2 224	21 350
	Mar	15	1 760	18 157
	Apr	1	4	48
	Jan-Apr	21*	4 588	45 415
G-N	Jan	13	1 295	11 691
	Feb	13	593	5 371
	Mar	3	101	909
	Jan-Mar	13*	1 989	17 971
Both areas	Jan-Apr	34*	6 577	63 386

Area	Time period	No. of fish	No. caught per 100 hook-hours	Fleet range catch per 100 hook-hours
GM	Jan	6 242	107	52-164
	Feb	38 018	178	111-235
	Mar	21 865	120	81-263
	Apr	32	67	67
	Jan-Apr	66 157	146	52-263
G-N	Jan	10 046	86	61-137
	Feb	3 250	61	25-182
	Mar	220	24	22-28
	Jan-Mar	13 516	75	22-182
Both areas	Jan-Apr	79 673	126	22-263

* Total number of vessels monitored.

TABLE 5: Catch rates by area and subarea of the top vessel in the Greymouth (GM) albacore fleet, 1978 season

Area-subarea	Time period	Hours fished	No. of hook-hours	No. of fish	% of total fish caught	No. caught per 100 hook-hours
GM	Feb	262	3 144	6 112	62.9	194
	Mar	251	3 012	3 577	36.8	119
	Apr	4	48	32	0.3	67
	Feb-Apr	517	6 204	9 721		157
G 20	Feb-Apr	22	264	471	4.8	178
G 21	Feb-Apr	38	456	475	4.9	104
G 22	Feb-Apr	97	1 164	1 078	11.1	93
H 20	Feb-Apr	9	108	139	1.4	129
H 21	Feb-Apr	64	768	1 121	11.5	146
I 19	Feb-Apr	11	132	247	2.5	187
I 20	Feb-Apr	125	1 500	2 968	30.5	198
I 21	Feb-Apr	13	156	81	0.8	52
J 18	Feb-Apr	14	168	303	3.1	180
J 19	Feb-Apr	68	816	1 491	15.3	183
J 20	Feb-Apr	56	672	1 347	13.9	200
All areas	Feb-Apr	517	6 204	9 721		157

TABLE 6: Catch rates by area and subarea of the top vessel in the Gisborne-Napier (G-N) albacore fleet, 1978 season

Area-subarea	Time period	Hours fished	No. of hook-hours	No. of fish	% of total fish caught	No. caught per 100 hook-hours
G-N	Jan	200	1 800	2 464	92.7	137
	Feb	20	180	195	7.3	108
	Jan-Feb	220	1 980	2 659		134
Y 11	Jan-Feb	13	117	163	6.1	139
Y 12	Jan-Feb	174	1 566	2 246	84.5	143
Y 13	Jan-Feb	21	189	235	8.8	124
Z 10	Jan-Feb	4	36	4	0.2	11
Z 11	Jan-Feb	8	72	11	0.4	15
All areas	Jan-Feb	220	1 980	2 659		134

TABLE 7: Catch rates by subarea of the albacore vessel fishing in the Bay of Plenty, May, 1978 season

Subarea	No. of hours trolled	No. of fish trolled	No. of hours poled	No. of fish poled	Total hours fished	Total fish caught	No. caught per hour fished
T 6	29	27	8	295	37	322	8.7
T 7	-*	-	-	-	-	-	-
U 7	-	-	-	-	-	-	-
U 8	4	4	1	15	5	19	3.8
U 9	-	-	-	-	-	-	-
V 8	8	19	4	530	12	549	45.8
V 9	3	3	0	0	3	3	1.0
V 10	-	-	-	-	-	-	-
W 9	-	-	-	-	-	-	-
W 10	-	-	-	-	-	-	-
All areas	44	53	13	840	57	893	15.7

* No catches, though vessel trolled lines through some of these areas while travelling.

